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SEDIMENT control conference

HELENA, MONTANA
GOVERNOR'S RECEPTION ROOM
STATE CAPITOL

DECEMBER 15,1972

THE OBJECTIVE--

The objective of this Conference is to help bring about recognition of a growing state and national concern about erosion prevention and sediment control -- awareness of existing and proposed actions in this field by state and federal government -- consideration of the physical and organizational aspects of sediment control -- consideration of the model legislation prepared under the auspices of the Council of State Governments, and development of a plan of action for sediment control by responsible leaders in Montana.

SOIL AND WATER CONSERVATION DISTRICTS' ROLE IN SEDIMENT CONTROL

Soil and water conservation districts have been leaders in sediment control for about 35 years. They have the experience, capability, and leadership to accept new challenges and handle new responsibilities in this field of work.

The Environmental Protection Agency recognizes the role of districts in this area. Here is an excerpt from the explanation prepared by EPA in connection with the model sediment control act:

"For about 35 years, local conservation districts, organized under state law to promote the wise use, care, and management of the nation's land, water, and related resources and supervised by a state agency which often has independent responsibilities for the conservation and management of natural resources, have been deeply involved in establishing and maintaining erosion and sediment control measures on agricultural and forest lands. Today, these same districts, which cover over 98 percent of the privately-owned lands in the nation, are directing their attention to the increase in and acceleration of soil erosion and sediment deposition occasioned by rapid shifts in land uses from agricultural and rural to non-agricultural and urban uses, by changes in farm and ranch enterprises, operations, and ownership, by construction of housing, industrial, and commercial developments, streets, highways, recreation areas, schools and universities, public utilities and facilities, and by other land disturbing activities."

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INTRODUCTORY REMARKS
SEDIMENT CONTROL CONFERENCE

Welcome each and everyone of you to this Sediment Control Conference. This conference is co-sponsored by the Montana Association of Conservation Districts, the Department of Natural Resources and Conservation, and the Montana Chapter of the Soil Conservation Society of America in cooperation with the National Association of Conservation Districts under contract with the Environmental Protection Agency.

The people in attendance at this conference are from many sectors of our Montana society. They represent various private and public organizations, state agencies and federal agencies, the legislature and most importantly, the people of Montana.

In the last few years our country and the people of our society have focused attention upon the environmental issues before us today. At this conference we are going to be discussing one of these issues: SEDIMENT.

I would like to review briefly what has happened in the past year. In March 1972 the Council of State Governments and the Environmental Protection Agency sponsored a symposium in Washington, D. C. to look at the sediment problems. The National Association of Conservation Districts and the Council on Environmental Quality joined in the symposium. Out of this cooperative effort came a draft of a model state sediment control law which was subsequently approved by the Council of State Governments' Committee on Suggested State Legislation. The federal government, as well as others, is taking a new look at the problem. Amendments to the federal water pollution control act would require the states to establish sediment control programs in the near future.

This conference is designed to awaken public interest in Montana on sediment control. Another objective is to stimulate discussion of what might be done to alleviate the problem. This meeting will be taped and it will be recorded. There will be opportunity for you to ask questions and for you to express your viewpoints. Then we hope to lead to development of a mechanism for action in whatever direction the state feels appropriate. We feel that you people are leaders in this state. You are leaders that can recommend the direction that this state should take.

Austin G. Slattery, President, MACD

MONTANA'S CONCERN FOR SEDIMENT POLLUTION

It is a pleasure to be here this morning and to welcome you to the Sediment Control Conference. I would like to express our appreciation to the co-sponsors, the Montana Department of Natural Resources and Conservation, the Montana Association of Conservation Districts, and the Montana Chapter of the Soil Conservation Society of America. The assistance of the National Association of Conservation Districts and the Environmental Protection Agency should also be acknowledged.

In recent years, concern for the quality of environment has swept our nation. Environmentalists warn of threats to the entire planet, and public awareness and apprehension have grown until pollution has become a major political issue. The concern is justified. Lake Erie is virtually dead, and other of the Great Lakes may well be terminally afflicted. Cleveland's Cuyahoga River is considered a fire hazard by some, and the Hudson River, once majestic, is little more than an open sewer.

We have been, thus far, more fortunate in Montana but we are certainly not exempt. The waters of the Yellowstone and Missouri Rivers, for example, are not of the quality we desire.

Some of our lakes are beginning to show signs of considerable pollution, notably Georgetown Lake west of Anaconda and Flathead Lake. Stream bank erosion is serious, saline seep problems are mounting. Wind and sheet erosion continue to trouble most of the cropland, while much of the rangeland undergoes erosion due to overgrazing.

Sediment, it has been determined, is the greatest pollutant by volume in America's surface waters. The Agricultural Research Service has estimated that some 4 billion tons of soil material are washed into streams each year. Although attempts have been made to alleviate the problem, erosion is actually accelerating. A common misconception is that agrarian practices are singularly guilty of causing erosion, whereas in fact the culprits are many.

Such factors as expanding urbanization, industrialization, highway construction, and surface mining cannot be ignored

---

Thomas L. Judge, Governor-elect

and, of course, natural or geologic erosion contributes some 30 per cent of the sediment.

There are many consequences. There is the loss of invaluable soil which has taken thousands of years to form. Almost 30 million tons of sediment originating east of the Continental Divide alone flows out of Montana each year. Franklin D. Roosevelt said in 1937, "The nation that destroys its soil destroys itself."

Our water supplies are polluted by sediment, plant nutrients and pesticides creating unnecessary demands on water purification and distribution facilities.

Sediment causes damage as it is being transported and wherever it comes to rest.

Commercial sites and residential districts are affected, recreation areas and fish and wildlife are harmed. Fort Peck Dam, for instance, stops 21 million tons of sediment annually.

To correct each of these problems necessitates the expenditure of substantial amounts of money, and that money could possibly be saved or put to better use elsewhere.

What has been done so far to combat sediment contamination in Montana? Nearly 11,000 farmers and ranchers on 30 million acres have written plans to conserve soil for the future while increasing its efficient use now. Our Highway Department is designing, building and maintaining highways with the conservation of soil and prevention of sediment pollution in mind. City and county planning boards are making use of soil information, and many developers are beginning to build in accordance with sediment control plans.

Legislation has been enacted which can apply to erosion and sedimentation including: The Streambank Protection Law, Water Quality Act, Environmental Quality Council, Conservation Districts Law, State Grazing Districts Law, Flood Plain Management Law, State Water Plan, Mined Land Reclamation Law; and proposed measures which could have a bearing on the problem are the Forestry Practices Act and the Montana Water Use Act.

Such state laws do provide a measure of sediment prevention and control, especially when combined with federal programs. Amendments to the Federal Water Pollution Control Act, recently approved by Congress, deal with all aspects of water pollution and pollution control. Local, state and

federal governments can be, when working together, an effective team.

However, much remains to be done. The 30 million acres covered by conservation plans, which I earlier mentioned, represent less than half the farmland in Montana and less than one-third the total area of the state. This parallels the national situation, for traditional voluntary programs have resulted in only about one-third of the nation's land being adequately treated. Laws have been passed in Maryland, South Carolina, Iowa, Ohio and the Virgin Islands establishing, or permitting to be established, wide programs of sediment control.

Many other states, among them Washington, New York, Virginia and North Carolina, are considering similar legislation. This should undoubtedly be one of the principle questions you deal with today: Should Montana move from voluntary to mandatory control of sediment?

Last year the Environmental Protection Agency concluded that the technical capability of controlling erosion and sediment deposition is available and that the cost is probably minimal. We need to determine the seriousness of the problem especially as compared to other priorities in the state. If a mandatory program is indeed desirable, who should administer it? How much will it cost and who will pay for it?

The task before you is not an easy one but it is certainly commendable. This Conference can be a positive step toward reviewing the problem in Montana and the adequacy of our present programs and laws. It can be highly productive in developing a plan of action to help protect Montana from the environmental degradation suffered in other areas of the nation. We need action now, not reaction later after more extensive damage has been done. Clean water is the key to human, agricultural and industrial well-being, to tourism, wildlife and recreation, to life itself.

My Administration will be committed to a high quality environment and this Sediment Control Conference can contribute significantly to that effort.

RESULTS OF CLARKS FORK SEDIMENT STUDY

The erosion and sedimentation study conducted in the basin of the Clark Fork of the Yellowstone River during 1971-1972 was initiated by a resolution passed at the 1971 Montana Legislative Assembly. It directed six state, federal, county and local agencies and organizations to study the sediment problem in the Clark Fork. Study was conducted only in the Montana portion of the basin.

Directed Agencies and Organizations

- Department of Health and Environmental Sciences
- Fish & Game Department
- Water Resource Division of the Department of Natural Resources and Conservation
- State Conservation Commission of the Department of Natural Resources and Conservation (Local Conservation District)
- Soil Conservation Service
- Beartooth Resource Conservation and Development

Others Participating

- Bureau of Reclamation
- United State Forest Service
- Bureau of Land Management
- United States Geological Survey
- Local schools

Assistance Also Provided By

- National Aeronautics and Space Administration
- Bureau of Indian Affairs
- Wyoming Water Planning Program

Participation was not only broad, but very enthusiastic; cooperation from all was exceptional.

Requirements directed in the resolution

1. Determine where the silt pollution is coming from
2. The extent of the problem
3. Recommend methods for controlling the problem

Three procedures

1. Turbidity measurements were taken by United State Geological Survey, Department of Health and Environmental Sciences, schools. (Turbidity is cloudiness of water) Flow discharges were also taken at the time of sampling.
2. Aerial and ground recon surveys
   Locate sources and determine causes of erosion and sedimentation resulting in pollution in the river
3. Remote sensing (infra-red photo and thermal imagery)

Ralph Saunders, Supervisor, Planning Section of the Resources and Planning Bureau, DNRC.

Remote sensing was discussed and considered because of the astounding difficulty of surveying such a large area in detail by conventional methods. Through the effort of the Bureau of Reclamation, the program was adopted, funded and implemented. Remote sensing was conducted from 5 miles below the mouth of the Clarks Fork River, and up the river to Pilots Peak including Cooney Reservoir were also taken.

Objectives of the Remote Sensing

1. Locate points of sediment discharge
2. Estimate relative magnitude of sediment concentrations between the river and tributaries
3. To show the usefulness of aerial remote sensing techniques in studying sediment movements

A ground truth data program took place simultaneously with the flight. It was gathered to provide the necessary correlation between conditions on the ground and those shown in the photographs.

Description of area--slides
Infra-red interpretation: color--clearwater appears dark blue; turbid water, light blue; vegetation, red

Conclusions of Remote Sensing
Inflows from tributaries, ditches, and gullies to the Clarks Fork Yellowstone River have been identified. Table 8 summarizes the contributing sources, real and potential, of sediment to the Clarks Fork Yellowstone River. Thirty seven (37) inflows to the Clarks Fork Yellowstone River and four (4) inflows to Rock Creek--Red Lodge Creek have a higher turbidity than the receiving water at their respective points of entry. Sixteen (16) inflows to the Clarks Fork Yellowstone River and four (4) inflows to Rock Creek--Red Lodge Creek have approximately the same turbidity. Forty two (42) inflows to the Clarks Fork Yellowstone River and three (3) inflows to Rock Creek--Red Lodge Creek have lower turbidity. Forty six (46) dry sites are tabulated as entering the Clarks Fork and nine (9) are entering, Rock Creek--Red Lodge Creek. More sites are represented than the actual number itemized since several drainage patterns may be included in a single dry site description.

All streams transport sediment to some degree (either as bed load, suspended load, or wash load) based upon the type of areas they drain, the stream velocities, and bed and bank materials. During the

spring run-off, higher sediment concentrations are normally encountered. As the run-off decreases, the sediment concentration decreases until a mimimum generally occurs sometime during the winter months. Thus the main stream reflects the sediment input from tributaries plus the amount of sediment entrained by its own flowing water.

The tributary flows into the Clarks Fork Yellowstone River, Rock Creek and Red Lodge Creek derive their sediment from numerous sources. Tributaries commonly pass through relatively barren land supporting only lots, and through small towns. In areas where small catchments exist on the side slopes of the canyon, the exact catchment area can be delineated and sediment sources readily identified. Tables 5, 6, and 7 identify the inflowing sources of sediment and describe some of the catchment areas which drain into the tributaries of the Clarks Fork Yellowstone River. However, since most photographs cover only the portion of the drainage basin adjacent to the river a complete description is not possible for each drainage area. It can be assumed that the adjacent fields contribute some sediment and in certain cases a change in the color of the water as it passes through a given field or the location of water in the stream or gully bed is a clue to the identification of the contributing source at the time of the photographs.

In general the following observations held for most cases. Groundwater return flow has a lower turbidity than the river. In one case the groundwater return flow traveled a sufficient distance through erodible material to entrain some suspended sediment. (See location number 68). Irrigation return flows had sediment concentrations equal to or greater than the river. Red Lodge Creek and Rock Creek were relatively clear water streams. This is to be expected since Red Lodge Creek derives its water from the discharge from Cooney Reservoir. Several smaller creeks such as Bennett Creek derive their water from sources in the Absaroka Range east of Yellowstone Park and are relatively clear and cold.

Results of this study indicate that aerial color infrared photography and thermal infrared imagery are practical tools for locating and identifying existing and potential inflows of sediment-laden water to a river system. Data can be obtained rapidly and accurately.

Color infrared photography effectively detects small changes in low concentrations of suspended particles in water and enhances the change by a color difference. Interpretation of the color infrared photography provides a means of qualitatively assessing the suspended material concentration of the river system. An interpreter can evaluate the ground truth information more accurately and can locate ground sampling sites that are representative of the phenomenon of interest. Field survey work can be performed with greater efficiency and at less cost because of prior knowledge about drainage locations, terrain and accessibility.

Thermal infrared imagery provides an indication of temperature differences of the river and tributaries. In this case, tributaries entering at approximately the same or at colder temperatures were observed. Tributaries entering at a higher temperature than the river were not detected.

Each of the above two systems provide information relative to the river system. Color infrared photography is best for identifying sediment concentration differences. Thermal infrared imagery provides an indication of the relative temperature of the scene. Together they provide a unique, quasi-synoptic view of the sediment transport process in a river system.

Preliminary Summary of Study Conclusions

The siltation problem in the Clarks Fork Yellowstone River is very broad and complex in nature. High concentrations and extended durations of suspended sediment in the river are having a significant effect on all beneficial uses of the water resource. Problems also prevail at the source of the sediment, in the form of various types of erosion. The study committee believes the scope of the problem is great enough to require immediate attention.

It is obviously not feasible to stop all of the sediment from reaching the river, because man has no practical means of controlling the natural influencing factors, such as steep erosive surfaces and high intensity storms. However, sediment production, in the basin, does not stop with the natural causes, there are numerous cases of man caused accelerated erosion taking place.

The study committee believes the major causes of the accelerated erosion in the basin are: reduced vegetation condition from overgrazing, reduced bank cover from cropping too close to streams, the use of natural tributaries to transport irrigation

water, oil production waste water discharges into drainages, stream channel disturbances, and irrigation return flows. Roads, improperly located dams, building construction, flowing wells and feedlots have also resulted in considerable erosion and sedimentation.

The present erosion situation in the Clarks Fork basin provides a great opportunity for substantial sediment reduction, and some valuable knowledge for managing similar fragile areas.

The report will be published shortly. Copies will be available on January 20. For those desiring copies, write to:

Gary J. Wicks, Director
Department of Natural Resources
and Conservation
Mitchell Building
Helena, Montana 59601

LAND USE AS RELATED TO SEDIMENT IN MONTANA
(PLANNING AND CONTROL)

I welcome this opportunity to discuss with you our mutual concern for Montana's Natural Resources with the hope our actions will lead to the improvement of our environment. My comments are more closely related to land use and sediment than to land use planning since what we actually do with the land determines the amount of sediment or its prevention.

Senator Jennings Randolf from West Virginia in his Keynote Address to a national sediment conference opened his remarks with the following statement: "Sediment is the world's greatest pollutant." This is in terms of volume produced and can be recognized as being a fact nationally as well as in Montana. Sediment is a carrier of other pollutants and creates problems over and above those created by soil itself.

Agricultural Research Service, who have done considerable monitoring of sediment, estimates that in the United States alone there are more than 4 billion tons of soil material washed into lakes, reservoirs, and tributary streams each year.

It is estimated that storage capacity of man-made reservoirs in the United States are being reduced by sediment at the rate of about 1 million acre feet per year. Montana is no exception. The Corps of Engineers have been monitoring Fort Peck Reservoir on the Missouri River since 1936 and the yearly average storage loss, due to sediment, is 17,701 acre feet per year. This amounts to 27 million tons of soil per year. Based on saturated soil weights of 70 pounds per cubic foot, this is equivalent to a 6-inch mantle over 35,000 acres annually. The U. S. Geological Survey, making similar studies on the Marias and Townsend reservoirs, report the average annual storage loss at 597 and 228 acre feet, respectively. The Marias Reservoir is accumulating sediment at a rate of 909,826 tons annually, while the Townsend Reservoir is receiving 347,594 tons. These are only a few of the reservoirs and lakes in the state receiving sediment but they serve as a good example of need for better erosion control to reduce soil loss and protect their storage capacity.

A. B. Linford, President, Soil Conservation Society of America

A comprehensive framework study on sedimentation in the Yellowstone River Basin was conducted by an inter-agency task force and gives some interesting data on sediment yield within that drainage basin. Variations in soil loss range from less than 50 to more than 1500 tons per square mile annually, with the highest losses coming from portions of the Wind, Big Horn and Upper Power River drainages. A sediment gaging station located on the Yellowstone River near Sidney, Montana shows the average annual sediment loss to be 300 tons per square mile or 208,350,000 tons for the 69,450 square mile sub-basin. This is nearly 5 tons per acre and represents a tremendous sediment loss in the Yellowstone River.

Most of us are familiar with the erosion process and the significance of soil loss to a declining economy and environment. If we are concerned with sediment as being our number one pollutant, we want to do something about it. The purpose of this paper is to acquaint you with its source or where it comes from. We have all seen Montana streams at floods stage and noticed the high turbidity or silt load they carry. We have also witnessed dust storms, gullies, road washouts and induced erosion from improper practices on farms and other construction activities.

I would like to relate a few facts about Montana's land and water resources.

According to the 1970 public land statistics, Montana has 93,271,040 acres of land and 897,280 surface acres of inland water, making a total of 94,168,320 acres. The Corps of Army Engineers report on streambank erosion in 1969 indicates there are 186,408 channel miles of streams of which 122,170 are considered live streams and flow water continuously. The Bureau of Sports Fisheries and Wildlife report that of the 122,170 miles of live streams there are only 13,898 miles of Class 1, 2, and 3 fisheries. This is only slightly more than 11 percent of our live streams that provide an adequate habitat for good fisheries which have made Montana famous. This is not to say that the other 108,000 miles of streams would provide this class of fishery but no doubt it can be improved and reducing sediment is one way to do the job.

Since the amount and kind of vegetative cover greatly influences the rate of soil erosion and sediment yield, land use becomes a major factor in determing the rate at which sediment occurs. The factors which determine land use are soils, location, climate, economics, land ownership, and the desires of the landowner of private land, and public desires in the case of public land.

The 1970 Montana conservation needs inventory of private and state owned lands and the Metcalf study on erosion and sedimentation report on public lands indicate there are 14,988,775 acres of cropland, 53,787,248 acres of range and pasture lands, 21,177,604 acres of woodland (part of which are grazed) and 3,317,213 acres of other land which include primitive and wilderness areas, as well as urban and built up, farmstead and roads in Montana.

Considering these land use breakdowns, let us now review some of the consequences as they relate to the source of sediment in our lakes and streams.

Normally, sheet erosion accounts for 50 percent of the sediment reaching Montana waters. This type of erosion is not spectacular and is difficult to see with the untrained eye. It involves the removal of thin layers of soil over extensive areas and is most vulnerable on bare or unprotected soils. Some 60 Million acres of Montana land is loosing soil at an estimated rate of 1 to 10 tons per acre per year.

Cropland comprises 16 percent of Montana land and is extremely vulnerable to this type of erosion. The conservation needs study shows that only 42.8 percent of the dry cropland and 11.2 percent of the irrigated cropland are adequately treated. Improved irrigation systems are needed on nearly 2/3 of the irrigated land to reduce water loss and soil erosion. Nearly 80 percent of Montana's cropland is in annually tilled crops and 56 percent have erosion as the dominant problem. On this basis, we are loosing about 63,000,000 tons of soil annually. This is equivalant to a 6-inch soil loss on 60,000 acres annually, 98 percent of the cropland is in private ownership and proper land treatment could reduce sheet erosion to a more acceptable level which would be less than 1 ton per acre.

Range and pasture lands comprise 58 percent of the land resources which range from poor to excellent condition on the basis of vegetation. Those lands when in fair and poor condition, are vulnerable to sheet erosion because of the exposed soil surface. Sediment yields from sheet erosion range from less than one to more than 4 tons per acre. Based on the conservation needs study about 42 percent of the rangeland and 38 percent of the pasture land are adequately treated and producing very little sediment. Because of slope, soil erosion is the dominant problem on 72 percent of the rangeland and 57 percent of the pasture. Through good range practices, soil losses from sheet erosion can be reduced well below 1 ton per acre per year. About 71 percent of all pasture and range is in private ownership, 21 percent is in federal ownership, and nearly 8 percent is in state ownership. Studies show the range conditions of public and private land to be quite similar.

Woodland comprises about 23 percent of the land resources and sheet erosion is relatively non-existent except for man's disturbance in timber harvest; 67 percent of the forest land is in federal ownership, 31 percent in private and 2 percent is owned by the state.

Other lands classified as primitive and wilderness areas have only normal geologic erosion and produce relatively small amounts of sediment in streams unless burned over, their rates increased. The Conservation needs study shows Montana to have 817,940 acres of urban and built-up area which consists of cities, towns, roads, railroads, and industrial sites. During the early stages of development, these areas produced tremendous volumes of sediment. There is evidence through current research that suggests sediment yields during construction will be as much as 5 to 500 times greater than in rural areas which are undisturbed.

Soil disturbance from strip and placer mining operations in the state exceed 25,000 acres. During operation, these areas are left barren and produce large volumes of sediment, some of which enter our streams and reservoirs. Current information from the Department of State Lands show there are 800 acres being strip mined for coal, 400 acres for bentonite, 540 acres for talc, 250 acres for vermiculite, 280 acres for phosphate, 150 acres for travertine, 3000 for placer and dredging and more than 900 gravel pits that vary from 1 to 10 acres in size. Current mine-law reclamation will help to control sediment damage from these lands.

The second most significant source of sediment is from gully channel erosion. It is claimed that as much as 30 percent of the sediment in our streams comes from active gullies. This spectacular type of erosion is easily seen and deeply scars the landscape. Indications are that Montana has 16,000 miles of active gullies which produce high volumes of sediment. Once gullies incise the landscape they are no respecter of ownership or Plant cover. They will invade range, cropland or forest and cut deeply into the soil mantle or soft geologic formations. They are characterized by having vertical or steep V shaped channels that erode easily, and are very difficult and expensive to reclaim. A combination of channel diversion structural measures and vegetative plantings are often needed for their control.

Natural geologic erosion of the soft shales and sandstone, often known as "Badlands" account for another 10 percent of sediment yields reaching our Montana streams. Locally this yield will run considerably higher and often reach 35 tons per acre. These areas have very little or no capacity to store water so vegetation is sparce or lacking. Steep slopes characterize the area and run-off is often

as much as 90 to 100 percent. Montana has nearly 4 million acres of these critically erosive lands and the cost of reclamation would be prohibitive. Good land management practices on the more gentle slopes below the steep shale breaks will reduce the sediment load that would otherwise enter our streams, lakes, and reservoirs.

The amount of sediment produced from streambank erosion and stream degradation is often over emphasized, since it is of such a spectacular nature. The streambank erosion study of the Corps of Engineers indicates there are 3,720 streambank miles which contribute about 4 percent of the stream sediment yield annually.

A large portion of streambank erosion in Montana is caused by the action of ice. Its abrasive and battering attack tears out vegetation that normally would afford some protection during periods of peak flow. Locally, rich productive farm lands are severely eroded in this manner. The cost of adequate streambank protection is extremely high and prohibitive for most private farm and ranch operators without some cost-share assistance. The kinds of structural measures and protection needed are based on several factors, such as structural walls for stream diversion, road construction, cropland protection, ice flows and actual flooding.

In summary, then, the sources of sediment in Montana as related to land use are as follows:

Up to this point I have talked about sediment, where it comes from, and its relationship to land use in Montana. Keeping in mind that sheet erosion produces more sediment than all other forms of erosion combined--and that most of this occurs on cropland then those practices which cut down or eliminate this are of most practical use to farmers and ranchers in Montana.

These are stubble mulch farming, strip and contour farming, terracing, field windbreaks, grass in rotation and protective grass waterways. Gully erosion is not so widespread and its control may require mechanical shaping and seeding, drop structures, water diversions, fencing and other more costly measures.

Well managed rangeland produces less than half of the sediment as range in poor condition. Harvesting methods, road building and handling of slash affect the amount of sediment from woodland.

Roadside and urban erosion may create serious and costly local problems. Vegetative cover, slope protection and

mechanical conservation measures can markedly affect sediment yield from these areas.

Good land husbandry regardless of land use is important if sediment is to be controlled.

The decision of what kind of land use based on the soil itself is a good starting point. Land treatment must be tailored to each particular situation.

There is another aspect of sediment control which has not been mentioned and that is the provision in Montana law or laws affecting sediment.

The most comprehensive law in Montana regarding soil erosion is the Conservation Districts Law providing for organization of Districts to provide technical assistance and other assistance to private land owners. This program is entirely voluntary on the part of participants and has had good acceptance on the part of the public.

The Water Quality Standards Act administered by the State Department of Health is another law directly and indirectly related to sediment.

The Streambank Preservation Act administered by the Montana Fish and Game Department provides review and direction on matters affecting streams.

The Surface Mined Reclamation Act administered by the State Land Department directed at reclamation of surface mines and gravel pits is another recently passed law related to sediment.

The Flood Plain Act relating to development of Flood Plains administered by the Water Resources Division of the Department of Natural Resources and Conservation is related to sediment, particularly in urban areas.

City and County Planning Act administered by the Department of Intergovernmental Relations, Planning and Economic Development Division, while not as specific as the other laws mentioned can have an effect on sediment control through the zoning and planning processes.

A newly proposed law entitled, "The Forestry Practices Act" has provisions which will most surely have a relationship to sediment on state woodlands.

Several federal laws passed recently will be discussed by Mr. Silliman who follows me on this program.

Of significance to this group and the discussion that follows is that all but one of the state laws mentioned have a provision for control which is not present in the Conservation District Law.

It is not my purpose to speculate on the necessity of this provision in the several laws quite closely identified, on the basis of land use and source of problem, to the district law. I would point out that our Montana legislative body thought so and included that provision in this entire body of legislation and some others I have not mentioned.

SOIL CONSERVATION SEDIMENT CONTROL PROGRAMS

It's a pleasure to be in the "Big Sky Country". It's also a pleasure to be a part of a conference where dedicated state leaders are considering the wise use, care, and management of soil, water, and related resources.

It's also gratifying to be in a state that believes in POSITIVE ACTION. I read positive action into the decisions of the Montana Association of Conservation Districts at the 1972 area meetings to involve all conservation districts, in cooperation with others, in land use planning by organizing a Land Use Planning Committee with the charge to provide:

> ". . . a statement of Montana Land Use Policy. Such policy shall include the development of land use planning programs at state and district levels and the provision of necessary leadership for their implementation, including the submission of legislative proposals to the upcoming session of the Montana Legislature.
>
> "This committee shall be authorized to seek assistance and counsel from other conservation organizations and technical sources they deem necessary to carry out this directive.
>
> "Time being of the essence, Be It Further Resolved: The charge of the Land Use Planning Committee be of the highest priority by this Association."

LAND USE AND MANAGEMENT AND THE ENVIRONMENT

The way man uses and manages land and water resources represents the most direct point of contract, conflict, and affect between man and his environment.

You know the positive or sometimes negative signs of this contact between man and the land through conditions such as:

EROSION from both water and wind. Soil erosion on a square mile of land can increase from as little as 50 tons a year on farm and ranch land to more than 25,000 tons a year on land being converted to urban uses.

Minott Silliman, Jr., Assistant Director, Resource Development Division, SCS, Washington, D. C.

INCREASED RUN-OFF OR DUST STORMS. Over one million acres of land annually are converted from agricultural to urban type uses in our country. Too often, step one in the transition from farm or ranch to the new use is to bulldoze away all the vegetation that has been holding the soil in place. Increasing the speed and amount of runoff water results as well as previous vegetative protection from wind erosion.

MISUSE OF SLOPING LAND. Misuse of steep slopes whether in cropland or urban use can cause problems such as increased runoff and excess erosion.

MISUSE OF THE FLOOD PLAIN. The average annual damage caused by floods is approximately $2 billion: and based on the current status of flood control works and projected conditions of flood plain use and development, this cost will increase to 3 1/2 billion dollars by the year 2000. Add to this the cost of flood protection for man-made structures in the flood plain, and you have the total price of not using the flood plain according to nature's plan for surface water disposal.

FAILURE TO CONSIDER SOIL PROPERTIES. When the physical properties of the soil are not given proper consideration in farming, ranching, or building, there are land use problems. Farmers and ranchers generally know the crops best suited to their soils, but many new land users do not realize the importance of considering physical soil properties such as soil absorption of the septic tank filter field for a new home or business.

These and other signs of conflict between man and his natural environment have caused an increasing number of people to become concerned both as individual citizens and as public officials in what is frequently termed protecting the environment.

EVIDENCES OF ENVIRONMENTAL CONCERNS FOR LAND AND WATER USE AND MANAGEMENT BY MANY PEOPLE

-- Muddy water and dust in the air is becoming recognized as polluted water or air by the man on the street.
-- Sediment is becoming recognized as our greatest water pollutant by volume.
-- The National Symposium on State Environmental Legislation held in Washington, D. C. in March of 1972 by the Council of State Governments included a workshop on Soil Erosion. A Special Committee on District Outlook of the National Association of Conservation Districts participated in the soil erosion workshop. Two very significant resolutions were adopted at this National Environmental Symposium, namely:

1. Responsibility for an erosion and sediment regulatory program should be placed in the conservation districts which have the responsibility under the laws of all fifty states for the control of erosion and sediment deposition. This responsibility would be in conjunction with, but would not replace, those state and local regulatory programs concerned with the quality of soil and water resources and pollution abatement activities.

2. Suggested state erosion and sediment control legislation should be drafted in the form of an amendment to existing conservation districts' enabling laws.

-- It is significant to note that "a Model State Act for Erosion and Sediment Control" is from the 1973 Suggested State Legislation of the Council of State Governments (Volume XXXII) whose main office is in Lexington, Kentucky.

-- The "Federal Water Pollution Control Act Amendments of 1972" include provisions for the development of plans relating to erosion and sediment control. Excerpts from this 1972 law are:

Under Title III--Standards and Enforcement, Section 304(e)

"(e) The Administrator, after consultation with appropriate federal and state agencies and other interested persons, shall issue to appropriate federal agencies, the states, water pollution control agencies, and agencies designated under section 208 of this Act, within one year after the effective date of this sub-section (and from time to time thereafter) information including (1) guidelines for identifying and evaluating the nature and extent of nonpoint sources of pollutants, and (2) processes, procedures, and methods to control pollution resulting from--

"(A) agricultural and silvicultural activities, including runoff from fields and crop and forest lands;
"(B) mining activities, including runoff and siltation from new, currently operating, and abandoned surface and underground mines;
"(C) all construction activity, including runoff from the facilities resulting from such construction;
"(D) the disposal of pollutants in wells or in subsurface excavations;

"(E) salt water intrusion resulting from reductions of fresh water flow from any cause, including extraction of ground water, irrigation, obstruction, and diversion; and
"(F) changes in the movement, flow, or circulation of any navigable waters or ground waters, including changes caused by the construction of dams, levees, channels, causeways, or flow diversion facilities."

-- The Coastal Zone Management Act became law in 1972. Its purpose is to encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs. The Department of Commerce is the administering agency.

-- Environmental control legislation was passed or funded by several states in the November 7, 1972, elections.

EXAMPLES OF ENVIRONMENTAL CONTROLS RELATING TO LAND AND WATER USE AND MANAGEMENT

The conservation objective of conservation districts and their cooperating agencies in the Department of Agriculture for the last four decades has been the use of each acre within its capability and the treatment of each acre according to its needs for sustained use.

There is a trend developing which suggests that the public is demanding, through laws, ordinances, regulations, codes, etc., that land be used within its natural capabilities and that conservation treatment such as erosion and sediment control must be considered.

Soil conservation districts throughout the Nation are being increasingly asked to help with land use planning and regulations. Planning, zoning, and environmental control agencies are recognizing that the same resource facts which help make the land use decisions can be used in the environmental controls.

Let's take a look around the Nation at some examples of the way conservation of land and water resources is being included in environmental programs. Note the input which conservation districts and others with natural resource facts and concerns are involved in these programs.

State of Colorado--Division of Land and Regulation--Thereof--Senate Bill #35 passed in Colorado in 1972

This bill deals with the design and implementation of a local land use management system, including the adoption and enforcement of subdivision regulations by counties. All counties must adopt new subdivision regulations or amend existing subdivision regulations in conformance with the act before September 2, 1972.

Boards of County Commissioners may not approve subdivision plats or plans unless the material submitted shows evidence that (1) definite provisions have been made for a water supply and for a sewage disposal method and (2) hazardous soil and topographic conditions have been identified and that land uses are compatible with such conditions.

Preliminary plans shall be distributed to various agencies, utilities, and units of governments, including soil conservation districts. The SCD boards are to review the plans and comment in the form of recommendations regarding soil suitability and flooding problems.

State of Florida--Environmental Land and Water Management Act of 1972

The Florida Environmental Land and Water Management Act of 1972 puts the state government in a position to exercise a limited degree of control over the growth and development of the state, while preserving the processes of local government agencies and rights of private landowners. The role of the state is focused on those land use decisions which will have a substantial impact outside the boundaries of the local government in which the land is located.

Under this new law, the governor and the cabinet are empowered to designate specific geographical areas as "areas of critical state concern," and establish principles to guide the development of each of those areas. To be an area of critical state concern, there must be environmental, historical, natural or archeological resources of regional or statewide importance; an existing or proposed major public facility or major public investment, or a proposed area of major development potential, such as a new community.

State of Vermont--Established capability land use plan--Vermont in 1970 created an Environmental Board and District Commissioners. One of the findings and declaration of intent in the act reads:

> "Now, therefore, the legislature declares that in order to protect and conserve the lands and the environment of the state and to insure that these lands and environment are devoted to uses which are not detrimental to the public welfare and interests, the state shall, in the interest of the public health, safety and welfare, exercise its power by creating a state environmental board and district environmental commissions conferring upon them the power to regulate the use of lands and to establish comprehensive state capability, development and land use plans as herinafter provided."

State of Maine--New developments consider environment--Maine revised their Environmental Commission statutes to conduct the location of developments in a manner which will have a minimal adverse impact on the natural environment of their surroundings. The act reads:

> "The Commission shall approve a development proposal whenever it finds that:
>
> "No adverse affect on natural environment. The proposed development has made adequate provision for fitting itself harmoniously into the existing natural environment and will not adversely affect existing uses, scenic character, natural resources or property values in the municipality or in adjoining municipalities.
>
> "Soil Types. The proposed development will be built on soil types which are suitable to the nature of the undertaking."

State of South Carolina--County Sediment Control Programs

> Counties are not required but may establish erosion and sediment control programs. Each county sets its own program criteria. Under this program a grading permit cannot be issued until the applicant submits a plan for controlling erosion and siltation and it has been approved by the soil conservation district board. The county governing body or the soil conservation district may enforce the ordinance.

State of Iowa--Conservation of soil and water resources and control of water pollution--Iowa state legislation on conservation of soil and water resources and control of water pollution, House File #73, Section 31 reads:

> "The commissioners of each soil conservation district shall, with approval of the state soil conservation committee, adopt, amend, and repeal such reasonable regulations as are deemed necessary to establish a soil loss limit or limits for the district and provide for the implementation of the limit or limits, and may subsequently amend or repeal their regulations as they deem necessary. The commissioners may:
>
> 1. Classify land in the district on the basis of topography, soil characteristics, current use, and other factors affecting propensity to soil erosion.
>
> 2. Establish different soil loss limits for different classes of land in the district if in their judgment and that of the state soil conservation committee a lower soil loss limit should be applied to some land than can reasonably be applied to other land in the district, it being the intent of the general assembly that no land in the state be assigned a soil loss limit that cannot reasonably be applied to such land."
>
> Section 35 of this act provides that no owner and occupant of land shall be required to establish new permanent soil and water conservation practices unless at least 75 percent public cost-sharing funds are available.

State of Illinois--Amended Conservation District Law

> The 1971 amendment to the Soil and Water Conservation Law of Illinois requires that by July 1, 1972, those petitioning municipalities or county agencies for variances to prevailing ordinances or to subdivide vacant or agricultural lands must furnish a copy of the proposal to the local soil and water conservation district. The SWCD has 30 days to submit a written opinion concerning the petition.
>
> Amendment (H. B. 3707) follows:
>
> "Sec. 22.02a (1) The Soil and Water Conservation District shall make all natural resource information available to the appropriate county agency

of municipality in the promulgation of zoning ordinances or variances, (2) Any person who petitions any municipality or county agency in the district for variation, amendment, or other relief from that municipality's or county's zoning ordinance or who proposes to subdivide vacant or agricultural lands therein shall furnish a copy of such petition or proposal to the Soil and Water Conservation District.

"The Soil and Water Conservation District shall be given not more than 30 days from the time of receipt of the petition or proposal to issue its written opinion concerning the petition or proposal and submit the same to the appropriate county agency of municipality for further action."

From Wisconsin

The Water Resources Act of Wisconsin (Laws of 1965--Chapter 614) contains enabling legislation encouraging counties to enact ordinances that (1) protect shorelands and navigable waters, and (2) provide effective flood plain zoning. If a county did not adopt such ordinances by January 1, 1968, the state regulation covering these items would be in effect.

A Buffalo County Zoning Ordinance passed in 1965 superimposes physical land conditions with subsequent land use restrictions as overlay districts upon the regular zoning districts. Example is a steep soils overlay zone superimposed on a residential zone requiring ten acres per dwelling unit.

Town of Belgium, Ozaukee County (1966) maintains an environmental corridor through a conservancy district zoning area.

Town of Belgium, Ozaukee County (1966) requires soils in the plat of survey requesting a building permit.

Walworth County, health ordinance (1966) lists the soil types that shall not be used for soil absorption sewage disposal facilities.

State of Pennsylvania--Environmental Quality Board

The Pennsylvania State Legislature has established an Environmental Quality Board and has given it responsibility for developing and implementing regulations for erosion and sediment control.

> The purpose of one of its regulations, adopted September 1972, is to control accelerated erosion coming from land disturbing activities. Thereby preventing the pollution of the streams and lakes of the Commonwealth. The regulation provides that erosion and sediment control plans will be prepared for all land disturbing activities by a person trained and experienced in control methods and techniques. It is expected that standards and specifications, other than those contained in the regulation will be provided by the SCD. The regulation includes agricultural land. By July 1, 1977, there shall be an erosion and sediment control plan for all tilled land.

State of Maryland--State Sediment Control Program. Maryland passed a Statewide Sediment Control Program in 1970. A part of their law reads:

> "In order to protect the natural resources of the state, the Secretary of Natural Resources is directed to adopt criteria and procedures to be used by the counties and the local soil conservation districts to implement soil and shore erosion control programs, such procedures may provide for the review and approval of major grading, sediment and erosion control plans by the Department of Natural Resources."

Conservation districts have been very active in helping carry out this statewide sediment control program. The conservation districts, with technical help from the Soil Conservation Service, have developed guidelines, standards, and spedifications to be used in carrying out their land use, erosion, and sediment control programs.

LAND USE ORDINANCE BY A CONSERVATION DISTRICT IN OREGON-1948

The Warrenton-Dune Soil Conservation District has been protecting a unique land area in their district since 1948 by adopting a land use regulation under the Oregon conservation district state enabling legislation. The dune area is identified in their ordinance and its use and conservation treatment are outlined in the ordinance.

INDIVIDUAL COUNTIES AND MUNICIPALITIES

There are examples of counties and municipalities scattered throughout the Nation that have adopted some type of environmental controls relating to land use, erosion, and sediment control such as: Fairfax County, Virginia; Montgomery County, Maryland; Otsego County, Michigan; Canfield, Ohio; Wichita, Kansas; and others.

The following letter describes the action the City Council of Casper, Wyoming, decided to take about a soil and water conservation problem within the municipality:

CITY OF CASPER
Incorporated 1889
Casper, Wyoming 82601

April 29, 1971

Mr._____
_____
Casper, Wyoming 82601

Dear Mr._____:

I have been asked to request that you file a firm plan for the control of dust and mud runoff from your undeveloped land in the area of _____ with the City Council by May 10, 1971. As I am sure you are aware, the City has received numerous complaints of blowing dust and soil runoff from this area. The receipt of your proposals, if acceptable to the Council, will avoid the need for the City to take further action in the Courts under the Police power or action to withhold public services in the area under the subdivision sections of the City Code.

If assistance is required to prepare a program to curtail these hazards, you may wish to contact Mr. T. J. Ellis* of the Casper-Alcova Conservation District. The matter will be formally discussed at the regular City Council meeting on May 17, 1971. Thank you for your cooperation.

Sincerely,

KENNETH ERICKSON
City Manager

*Mr. T. J. Ellis is Chairman of the Casper-Alcova Conservation District, Casper, Wyoming.

SUMMARY

The basic principles of soil and water conservation being utilized by soil and water conservation districts and cooperating bodies in environmental enhancement and controls are:

-- Plan land uses that will fit the land and minimize the potential problems of erosion, sedimentation, dust storms, flooding, hazardous soil conditions, etc.;

-- Obtain, interpret, and use resource data such as soil surveys and data on geology, topography, surface water management, and vegetation in making and carrying out land use decisions;

-- Plan and install soil and water conservation measures for all land uses: farming, ranching, housing, commercial, industrial, recreation, transportation, etc.;

-- Involve soil and water conservation districts in conservation plan development and conservation plan implementation;

-- Base the technical guidelines, standards, and specifications for land use, erosion and sediment control upon the technical expertise available to conservation districts through their longstanding working arrangements with the Soil Conservation Service and other federal and state agencies.

STANDARDS AND PROGRAMS FOR SEDIMENT CONTROL

First of all, I'd like to express the Environmental Protection Agency's appreciation to all of you for taking the time and effort to participate in this important seminar on sediment control. I would especially like to commend the organizers of these proceedings for a job well done and to urge a continuation of such efforts as the recommendations of this conference are put into practice.

The development of sediment control programs, like all efforts of importance, will require perseverance, but the rewards will be great. The vast background of soil conservation which this conference draws upon is an indication of the perseverance that will be required. With this vast background in mind and recognizing the long road ahead, let me quote to you from Josish Holland, an American novelist of the middle 1880's on perseverance. "There is no royal road to anything. One thing at a time, all things in succession. That which grows fast withers as rapidly; that which grows slowly endures."

My topic this morning is Standards and Programs for Sediment Control. Since the Model Legislation discussion will delve into the standards aspect in some detail, I will speak to my topic in two major related areas. The first area deals with sediment as a pollutant and the second deals with the Federal Water Pollution Control Act Amendments of 1972 as they relate to nonpoint source pollution control.

A question that often arises when discussing erosion and sedimentation control in the context of environmental protection is---"Is sediment really a pollutant?" The answer is--It depends upon the amount and location of the sediment.

As has been pointed out here this morning, the erosion, transportation and deposition of sediments are continuous natural phenomena that are essential to maintain the normal regimen of river systems and to support the life cycles of aquatic organisms in these waters. We in EPA have no intention of making the waters of the United States sterile by our actions. These waters were not sterile before man began using them as waste dumps or abusing them by his land use activities. When man's impacts are reduced and his past abuses ameliorated, these waters will not be sterile. Rather, they will support a much broader range of uses and be more productive in terms of quality and probably of quantity.

Keith D. Snyder, Environmental Protection Agency, Denver, Colorado.

Man's impacts on the environment have been accelerating at a geometric rate in recent years as a result of: population increases; a growth in production from an ever expanding technology; and a growth in the demand for new products. The wastes from this population and the products they demand along with the misuse of land have resulted in an imbalance with nature that must be corrected if we are to continue to enjoy the good life.

Man's land development activities are one of the imbalances that have caused severe and highly undesirable readjustments in the natural sedimentation cycle, particularly in local areas, by drastically accelerating the erosion process. These activities include housing developments, shopping center complexes, industrial developments, strip mining, road building, and construction of dams, canals, railroads, bridges, and power lines. Farming and forestry can also lead to excess erosion and sedimentation through such practices as: marginal lands being brought into production, overgrazing, continuous row cropping, clear-cutting and poor conservation practices. Thus, as a result of man's activities, we have the transportation and deposition of excess quantities of sediments in downstream areas.

We know that excess sedimentation: destroys fish spawning beds; covers aquatic food supplies; fills in navigation channels, reservoirs, and estuaries; increases the water treatment requirements before it can be used for municipal and industrial water supplies; reduces the recreation value of the waters; is aesthetically displeasing while suspended in the waters; and often leaves severely scarred landscapes with reduced productivity in its wake.

Many times the costs associated with these pollution damages such as the cost of cleaning up the waters, of accepting the reduced aquatic productivity and recreation potential, and increased flood damages, as well as the costs of restoring scarred landscapes are shifted to the taxpayer or some downstream user rather than being paid for by the polluter---the one who did not consider these costs and prevent their consequences when he carried on his activities. To date, only a small number of localities have organized and implemented effective control measures to prevent such damages. However, it appears that technical capability is not the limiting factor. Rather, it is how this technical capability is applied, financed, and administered.

The costs of erosion and sediment control are minimal although there is a cost involved and one that is sizable when measured over time and across the nation. However, these costs are offset by the reduced damages so that we often find a net gain from erosion control rather than a cost.

Damages and Costs

Our current concern regarding sediment problems reflects the present public interest which has shifted almost overnight from the value of a ton of soil lost on agricultural lands to the damages to other users and the public expenditures arising from the need to remove the same amount of soil from estuaries, lakes, and reservoirs.

Whenever the velocity of streams carrying heavy sediment loads decreases sufficiently, deposition occurs which in turn causes costly damage to water areas and to public and private lands. For example, obstruction of stream channels by masses of deposited materials reduces their hydraulic capacity which, in turn, causes an increase in flood heights and a consequent increase in damages. Approximately 100 million dollars, or one-tenth of the annual damage from flooding in the U. S., is directly attributed to sediment. Total estimated damages resulting from accelerated erosion and deposition of excess quantities of sediment come to approximately one billion, three hundred million dollars annually. This includes dredging costs, damages to soil in agricultural areas, and to homes, roads, businesses, bridges, yards, and recreation areas.

At the present time, the Environmental Protection Agency has a contract study underway to obtain adequate and reliable information to compare the cost of retaining sediments on construction sites with the cost of correcting damages resulting from erosion and deposition on the site and in downstream areas. Preliminary indications are that this study will provide substantial information showing that it is much less expensive to contain sediments on the sites than to pay for subsequent damages and/or treatment costs. A similar type study done recently for the U. S. Department of the Interior indicates that, in the Potomac River area, control of 91 percent of the sediment from construction sites can be achieved by conventional practices for a cost of approximately $1,125 per acre while sediment damages in the watershed could reach $1,500 per acre. In other words, by establishing effective erosion and sediment control programs in a drainage basin, an agency can save its taxpayers approximately $375 for each acre of land being developed for urban purposes. If one takes the estimated figure of 4,000 acres of land being disturbed each day for land development, highway construction, and industrial sites, annual savings of over five-hundred million dollars are realized for the taxpayer by providing conventional methods of erosion and sediment control on the sites.

Legislation

So far we have discussed sediment as a pollutant and some of the reasons for the Environmental Protection Agency's interest in its control. Next we'll discuss some of the specific parts of the Agency's legislation that deals with sediment or nonpoint source pollution.

As you know, Federal Water Pollution Control Act Amendments of 1972, commonly referred to as the "Water Bill", recently became law. The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Its National goals are: (1) to obtain an interim goal of water quality by July 1, of 1983 which will provide for the protection and propagation of fish, shellfish, and wildlife and for recreation in and on the water, and (2) the elimination of discharge of pollutants into navigable waters by 1985. Navigable waters, by the way, are defined as "Waters of the United States, including the territorial seas". Pollutants include, among other items, such various materials as ". . . heat, wrecked or discarded equipment, rock, sand, and cellar dirt, and industrial, municipal, and agricultural wastes discharged into water".

There are several sections of the Bill which are of particular interest to those here concerned with sediment control. Probably the foremost of these is Section 101(b) where it states that the Policy of Congress is to recognize, preserve and protect primary responsibilities and rights of states to prevent, reduce, and eliminate pollution and to plan the development and use of water and land resources. I think that you will find this philosophy sprinkled throughout the Act where Congress has given the states primary responsibility or the option of accepting the primary responsibility for pollution control programs. In addition, the states, local governments, and often times industries, have been given strong advisory roles in developing the pollution control programs. However, at the same time Congress maintained the ultimate responsibility for the control programs should the states fail to meet their responsibilities.

Congress has given the Administrator of the Environmental Protection Agency the responsibility to administer this Act (Section 102(a)). He is directed to prepare and develop comprehensive National programs for preventing, reducing, or eliminating the pollution of navigable waters and ground waters, after careful investigation and in cooperation with other Federal agencies, State Water Pollution Control agencies, interstate agencies, municipalities, and industries involved.

Also, the Administrator shall encourage cooperative activities by the State and the enactment of improved and, so far as practicable, uniform state laws relating to the prevention, reduction and elimination of pollution (Section 103(a)).

Research

In carrying out his responsibilities for establishing National programs for the prevention, reduction, and elimination of pollution, the Administrator is required, among other things, to: in cooperation with other Federal, state, and local agencies, conduct and promote coordination and acceleration of research, investigations, experiments, demonstrations, and studies related to the causes, effects, extent, prevention, reduction, and elimination of pollution. Render technical services to appropriate agencies in carrying out these programs and establish advisory committees composed of recognized experts to assist in the examination and evaluation of research progress and proposals and to avoid duplication of research (Section 104(a)).

To meet the provisions just discussed, the Administrator is authorized, again among other things, to: (1) develop effective and practical processes, methods, and prototype devices for control and elimination of pollution (Section 104(b)(7)); (2) collect and dissiminate, in cooperation with Federal, state, and other pollution control agencies, basic data on chemical, physical and biological effects of varying water qualities and the information related to pollution and its control (Section 104(b)(6)); and (3) cooperate with other Federal Departments and Agencies, other public and private agencies, institutions, organizations, industries involved, and individuals, in the preparation and conduct of the research and studies on the causes, effects, extent, prevention, reduction and elimination of pollution.

Planning

To accomplish the objectives of the Bill within the required schedule, numerous deadlines must be met. For example, with regard to nonpoint sources such as sediments, Section 208 gives the Administrator only 90 days after the effective date of the Act (October 18, 1972) to publish guidelines for identifying areas which, as a result of urban-industrial concentrations or other factors, have substantial water quality control problems. The Governor of each state then has 60 days following the publication of the guidelines to identify these areas and 120 days after such identification to assign the boundaries and designate a single representative organization capable of developing effective area-wide waste treatment management plans for such an area. Within one year after the designation by the

Governor, this organization is to have in operation a continuing area-wide waste treatment management planning process, applicable to all wastes generated in the areas involved. The waste treatment management plans and practices shall provide for the application of the "best practicable" waste treatment technology . . . and to the extent practicable, waste treatment management shall be on an area-wide basis and provide control or treatment of all point and nonpoint sources of pollution, including in place or accumulated pollution sources (Section 201). Any plan under such process shall include, but not be limited to, processes to: (1) identify, if appropriate, agriculturally and silviculturally related nonpoint sources of pollution, mine-related and construction, and the related nonpoint sources of pollution, and (2) set forth procedures and methods to control to the extent feasible, such sources (Section 208(b)(2)). The plan shall be certified by the Governor of the state, or his designee, and submitted to the Administrator of EPA for his approval.

Section 304 is closely related to Section 208. It required the Administrator within one year of the effective date of the Act, and from time to time thereafter, to publish and issue to appropriate Federal agencies, the states, water pollution control agencies, and other designated agencies mentioned before, information including guidelines for identifying and evaluating the nature and extent of nonpoint sources of pollutants and processes, procedures, and methods for effecting control of pollution from agricultural and silvicultural activities, mining activities and construction activities. Consultation with appropriate Federal and state agencies and other interested persons is required during the development of these guidelines. The information dessiminated in accordance with the requirements of Section 304 of the Act will be used by the states in developing their area-wide management plans required under Section 208.

Another pertinent section of the Act is 305(e) which requires each state to prepare and submit to the Administrator by January 1, 1975 and bring up to date each year thereafter, a description of the nature and extent of nonpoint sources of pollutants, and recommendations as to the programs which must be undertaken to control each category of such sources, including an estimate of costs of implementing such programs. These state reports together with an analysis, will be submitted to Congress by the Administrator on or before October 1, 1975 and annually thereafter.

Conclusion

Effective control of erosion and sediment deposition resulting from man's land-disturbing activities can be fully achieved only by vigorous and aggressive action by all levels of government with the complete cooperation and support of concerned members of the community.

There is a definite need to make land developers, highway commissions, and people in communities aware of how these "run-away processes" of the sedimentation cycle can effect conditions around them. In this same vein, it is important to make people aware that their land-disturbing activities do harm others and that they should be responsible for preventing such damage.

As was mentioned before, it is much less expensive to keep soil on construction sites than to remove it from land or bodies of water further down the stream. The development and adoption of local ordinances for effective control and the preparation of organizational procedures for gathering and applying the technical knowledge required is urgently needed. Local organizations and their officials have to acknowledge their share of the responsibility. State and Federal Governments can provide broad guidelines and some financial assistance for local areas, but the principle tasks of developing proper management techniques, establishing adequate implementation procedures, and requiring effective enforcement methods must fall upon state and local officials. The impetus to adopt state legislation and local ordinances for effective control must be provided by concerned and informed members of the state or community involved.

EXPLANATION OF MODEL LEGISLATION
PREPARED BY COUNCIL OF STATE GOVERNMENTS

I think we've covered most of the information that might serve as preliminary remarks as far as the formulation of this model legislation would go. We've looked at the scope of the sediment problems in Montana; we've checked into the actions taken in various states across the country; we have had demonstrated here the interests of the federal government and I think Keith pointed out very well that the cost of prevention is quite a lot less than the cost of removal. We've had mentioned two or three times the task force on erosion control and I think the fact that this draft model law is a general guideline--that it's a statement that was prepared by the Council of State Governments with assistance by MACD and other organizations that was comprehensive enough to be considered as possible guidelines in every state in the country--we might want to keep that in mind. I'm sure if any follow-up action was taken here in the state of Montana that in the amendments changes or alteration of the wording would be necessary, but basically my responsibility here was to discuss the act as it is formulated and I think that without any philosophical statements, I'll just go right into the intent, purpose, scope and what the various sections do mean.

There is a copy of this model act, of course, in the packet that you have been given and Slim encourages each of you to take a look at that material and possibly you might want to check this over a little later because I certainly am not going to read this thing verbatim, but touch on a few of what I consider to be the important aspects of the law and how we might relate these principles contained within each section.

The intent of the act is to amend the Soil and Water Conservation Districts Law in any state whereby they have sufficient interest and determination to attempt to correct the sediment problems that do exist in that state. It's to provide for an acceleration and an extension of the program of soil erosion and sedimentation control. These programs, of course, do exist where there is Conservation Districts Law and in varied degrees of intensity according to the ordinances etc. such as June Silliman mentioned earlier. It is also the purpose of this act to prepare general guidelines at the state level and to prepare guidelines in accordance with those state guidelines by each Soil and

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Marvin Cronberg, Western Program Officer, NACD, Denver, Colorado.

Water Conservation District (consistent with whatever is set up as guidelines and standards by the State Commission). It is also to require the filing and approval of plans for the control of soil erosion--such as this might serve as an example of--to file the plans in connection with land-disturbing activities, and a little bit later I'll define somewhat those land-disturbing activities as they are referred to in the law. To provide for inspections and reports to declare certain acts to be unlawful and to provide for administrations, enforcements and financing to carry out the intent of the act.

As I mentioned earlier, it does state land-disturbing activities throughout the text of this law; this might be an example of a land-disturbing activity--of course there are others--I'll go into detail on that in just a few seconds. (slides) In the declaration of policy, you'll find that one of the primary areas of concern--the reason for the formulation of this law--are the shifting land uses; essentially those from agriculture to non-agriculture or from rural to urban. It is also concerned about other land uses that are in effect, as we have already been told here, accelerating a removal of soil and topsoil and sediment from our land resources such as highway building, changes in farm and ranch enterprises, urban development and construction. This process, as I mentioned, has accelerated the removal of soil to the point of where it is now recognized by the federal government as a pollutant and in actuality, sediment has now been declared to be illegal. The reasons behind this are many, of course, but just a few: it damages our domestic facilities; it damages agriculture, industry, recreation, fish and wildlife and other resource uses.

We talked a little about land-disturbing activities. In the law there are about a half a dozen that I mentioned, but this again is an area whereby the pure definition of what this activity might be in any one state would depend upon how the standards might be set up. For example, it says here "land-disturbing activity means any land change which may result in soil erosion from water or wind and the movement of sediments into state waters or onto other lands. That's the general definition and then it goes on to include, but not limit it to, clearing, grading, excavation, transporting and tilling of land other than federal land (which we'll talk about a little later) except that the term shall not include such minor land-disturbing activities as homegardening, individual home landscaping, repairs, maintenance work, etc.

The law calls for the setting up of guidelines and standards at the state level by the State Conservation Commission or the equivalent authority in each state. I'm familiar with the term Conservation Commission and that Minot mentioned that it may not be appropriate here in Montana, but it is the

equivalent authority. It says in here that the Commission, and I think this is important, in cooperation with the State Water Quality Control Agency and other appropriate state and federal agencies, develop and coordinate a comprehensive state erosion and sediment control program. And then he goes on to say "to assist the development of this program, a commission shall name an advisory board and it shall have seven to eleven members--not less than 7 or more than 11--and these members shall represent a variety of interests." Included among those interests which it mentions in the law are such interests as housing, financing, industry, agriculture, recreation, local governments or planning, transportation, health, public works and zoning commissions or agencies.

So just to reiterate a little bit, the commission, with the help of these advisory members, will set up standards--will set up a plan for erosion control--within the state. Now once these standards are set up, they are subject to public review and modification. I think this is a procedure that you're probably familiar with--something like a Bureau of Land Management National Framework Planning Effort whereby they do have these public hearings and they request comments; then they modify them before they come out with the final plan. It says that these standards must be based upon relevant physical and developmental information concerning watershed and drainage stations of the state; including but not limited to data relating to land use, soils, hydrology, geology, size of land areas being disturbed, fraction of water bodies and their characteristics, transportation, public facilities and services. I believe the point contained in this section is that the standards depend upon the capabilities and limitations of the resources in that particular area.

It also says in here that the Commission shall designate within these standards and regulations those critical areas of sedimentation which require some type of immediate action and more stringent regulations (such as might be detected by this map right here--slides). Now, once we have these standards regulated or formulated at the state level, once they have been viewed and accepted by the public and approved as the official plan for the state of Montana, "then the Conservation Districts have one year from the time that these are approved to draw up their own plan containing their own regulations and standards that fit within the state's standards and guidelines. The district, too, shall use an advisory board of not less than seven or more than eleven members to represent the various interests throughout the district." Therefore, we do have the input of all segments of agencies, as I mentioned, of private industry whereby they have a concern with this land resource use.

Once the plan for the District is formulated, it is subject to review by the Commission and it must be reviewed at that level and approved. It states in this section that if a District fails to submit a program to the Commission within the period specified herein, and they suggest one year (it could be more or less depending upon your situation), if they do not submit that plan, then the Commission shall, after hearings or consultation as it deems appropriate with these various local interests, go ahead and develop the plan for that particular district.

In areas where there is no District, or where there are state lands, it is the responsibility of the Commission to develop a set of standards and guidelines for that particular area. This shall be done and then they shall designate a local unit of general government to develop, adapt and carry out this plan. In other words, if we had an area that was not in a Conservation District or if we had a large area of state land, the Commission would then develop the general standards and they would empower a local unit of government of some form or another to act as a Conservation District to see that this plan is carried out.

Now we're down to the state where the Commission has drawn the general standards and every District has prepared their plan for sediment control within their District. From this point on, as it states here in the law, no person may engage in any land-disturbing activity until he has submitted to the District a plan for erosion and sediment control for such land-disturbing activity and such land has been reviewed and approved by the District. Once the standards are accepted and approved, then every type of land-disturbing activity within the scope of the law must be submitted to the District, along with the plan for sediment control; and they in turn must review it and approve it before any activity can take place. In the event where we have once again, a no-District situation or a large area of state land, a Commission shall review these plans that are submitted directly to it. It's up to both the District and the Commission, whichever the case may be, to determine if these plans are adequate--if they will do the job. When a plan is submitted for approval under this section, and it is found upon review by the Commission to be inadequate or the District and the Commission to be inadequate, it may require modification in terms of conditions that are contained within the law. The person responsible for carrying out these approved plans finds that because of a change of circumstances or for other reasons the approved plan cannot be effectively carried out, and any proposed amendments to the plan consistent with the requirements of this act are agreed to by the plan-approving authority and to the first person responsible for the plan, he may then submit his modifications that may in turn become the plan as it is modified.

Any person that owns, occupies or operates a private, agricultural or forest land who has a farm or ranch conservation plan which has been approved by the District (and a farm or ranch conservation plan is explained quite well in the material that you have available) but any individual who has one of these plans on his farm or ranch and who is in the process of implementing this plan, shall not be deemed to be engaged in a prohibited land-disturbing activity. The conservation plan also applies to the urban areas as we will see in a minute. But basically, the point in this section is that if you have a farm or ranch conservation plan, then you're not determined to be engaged in a prohibited land-disturbing activity. This is contingent upon the fact that there is available to the owner a 50% cost-sharing assistance and adequate technical assistance, to carry out the intent of the act. The situation here being that as we have had mentioned earlier today, some of these corrective measures are too expensive for the cost return operation of a farm or ranch to engage in, thereupon the federal government shall assist in the best interests of the nation (and it shall do so through cost-sharing and at the rate of 50%). Now, if in fact 50% cost-sharing assistance is not provided within that county for these type of activities, then the farm or ranch (or the farmer or rancher) is not subject to the penalties of this act because it is not valid.

It goes on in Section 6 to say that no agency authorized under law to issue grading, building or other permits for activities involving land-disturbing activities, may issue such permits unless an erosion and sedimentation control plan is submitted with the request for the permit. And this goes to the District and must be repeated by the District before the permit can be issued by the permit-issuing agency.

It is in three Sections here--Sections 7, 8, and 9--that govern the inspection process and monitoring process. Actually there are two different types of inspection, depending upon the situation involved. Number 1, for example, let's say that in a section of land where a permit is required, a permit-issuing authority is responsible for the inspection to see if the erosion prevention and control plan is being carried out and, in any effect, working. Up at the top, we have a situation where a permit would <u>not</u> be required--the Commission then shall designate whatever authority is responsible for making those inspections. In the case of a farm or ranch, it is up to the local Conservation District to determine who and how the inspections shall be carried out, but in all cases it is stated in the law that the inspection cannot take place without notice to the owner or operator; that he shall accompany them upon the inspection; and that all considerations shall be given to the process of inspection whereby fault may be found. Now in the event there is default on the erosion control plans (discovered

through the process of inspection) it's quite detailed in the law that tells about the notice, the amount of time that can be designated when corrections must be made, and, of course, if they are not made within that amount of time, all things cosidered that are involved in the default, then, of course, the penalties are in order.

Section 8 governs the cooperation with federal agencies and I have shown here a memorandum of understanding that has been signed by one of the Colorado Districts with the Bureau of Land Management just to depict the type of vehicle that may be necessary between a local Conservation District and the various resource agencies that exist within the boundaries of that District. But it does say here that the District and the Commission are authorized to cooperate and enter into agreement with any federal agency in connection with plans for erosion and sediment control with respect to land-disturbing activities on lands which are under the jurisdiction of the federal agency.

Now the question's been put to me several times "Well, how are you going to make the federal land management agencies comply by the law?" It's already stated in the Federal Water Quality Act that where there are state regulations for water quality control, and in effect sediment is now included in those regulations, but where there are such regulations, then the federal government must comply with them.

Section number nine governs financial and other assistance, and what it states here in the law is that the Commission or Districts are authorized to receive from federal, state and other public or private sources: financial, technical or other assistance for use in accomplishing the purposes of this act. (Permissive language whereby a District may get federal grants, federal money of various types, state money, other public money or private money to carry out the intent of the act.)

Section 11 covers the penalties, injunctions and other legal actions--it's not quite as serious as depicted in this picture, but it does. . . If you are found in violation of your erosion and sediment control plan, they won't take you out and hang you, they will find you guilty upon conviction of a misdemeanor and I think the fine is up to $500 and possibly one year in jail--that's what the penalty is and does. In this section, it also says that the county attorney shall, upon request of a District or the permit-issuing authority, take legal action to enforce the provisions of this act. And it falls upon the responsibility of the county attorney to follow through on the enforcement once the District does make that request.

I would say that if a state should pass this act, essentially as it exists here, that they would probably have pretty much a pat hand in the field of erosion and sediment control. But even then, it wouldn't do you much good if you didn't have the backing and the data--just the same as it wouldn't in a hand of poker. Section 12 does say that the permissive language should be entered here to allow for the appropriation of funds in the state treasury and to finance the activities authorized by this act. I think that possibly some of Keith's figures on the cost of prevention that we heard earlier this morning might give you an indication of initially what that would be. It will take administration, in some cases it may take personnel, it depends almost entirely on the scope of the problem and the intensity of the corrective action that will determine what this appropriation might be, but this is included in the act.

VIEWPOINT OF WATER QUALITY BUREAU
DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

Mr. Willems is in Denver today and he asked me to fill in for him in this program. I am in the Water Quality Bureau working with Don and he had some notes that I'm going to deliver to you and I have some notes here of my own.

Up to this time, the State Department of Health efforts have been primarily devoted to domestic sewage and industrial wastes. Montana's municipalities, for the most part, have adequate sewage treatment and the remainder should have adequate treatment within a 4 year period. The same holds true for industrial wastes as the remainder of our industries that are not discharging adequate waste now will be on a compliance plan and within a 3 year period their wastes should be adequate. At the present time, one of Montana's major pollutants, as we have heard today, is sediment. It is also one of the most difficult pollutants to control because of the diverse sources. If we want to improve the quality in our streams, I think this is certainly one of the aspects that we should be looking at in the very near future. Montana's Water Pollution Control Act could possibly be used in its present form to control erosion and sedimentation; there are general provisions which could probably be adaptable to the drafting of specific regulations. However, it would be best, I believe, to present a law itself relating to erosion control. Our present water standards make mention of turbidity and sedimentation. Allowable turbidity increases above that normally occurring are five Jackson Candle Units for our high elevation streams, and ten Jackson Candle Units for most of our lower streams.

Policy statements are also included in the standards that pertain to erosion control. In 1971, the Department of Health wrote guidelines for road construction and maintenance of roads to prevent water pollution. This is intended primarily for our subdivision and its intent was to reduce sedimentation and erosion. It is our belief that if the state wants cleaner waters, and wants to protect waters of existing high quality, a sediment law should be developed now. We believe the model act that is presented here is a step in the right direction. It must be pointed out, however, that laws and regulations alone will not stop sedimentation. As you look at the long list of laws and regulations we presently have that could be used to influence sedimentation, I think this is a very significant point. We have many, many regulations right now that if they were enforced, eventually could reduce sedimentation.

Max Botz, Water Quality Bureau, Environmental Sciences Division of the Department of Health and Environmental Sciences.

Considerable additional effort is needed, this will include personnel, manpower for investigations of sediment problems, funding for corrections of sediment problems. I believe some of our agricultural subsidy programs should require sediment controls as a constraint in the subsidy.

Our present knowledge of sediment sources, sediment transport, and the effects on aquatic systems is very poor. A great deal of effort will have to be devoted to sampling, analysis and interpretation of sedimentation information. Many sediment sources such as intermittent streams andurban runoff are periodic and very difficult to measure. Agriculture has been indicted as a major sediment source, although this may be true, there is so little sediment data in Montana, that I doubt that any activity can quantitatively be evaluated as to its sediment impact. Accelerated activities such as land developments for recreation, subdivisions, and logging road construction certainly pose a threat to stream sediment balances.

There are many factors important to erosion, the major topic in this conference has been agriculture, but urban and recreation developments are increasingly important. Our recreation subdivisions and many of our towns are often in high quality watersheds, where a unit of sedimentation may be much more damaging to a stream than it would be in some of our eastern waters, where natural sediment levels are considerably higher. Any of you that have looked at storm sewer drains during heavy runoffs or chinooks in the wintertime, I think will see that this also is a very important point. Actions to control sediment problems may be as complex as the sources of sediments. Improved agricultural practices will hlep arrest sedimentation and as Mr. Linford as ably pointed out, these are of a very important contribution to sedimentation in our streams--volume wise. Dams to trap sediments are useful, dams simply buy time and certainly are not suitable. Zoning laws can be a very powerful tool to sedimentation. I had the opportunity of working on a recent very comprehensive zoning program at Lake Tahoe, and there they passed probably one of the most stringent, if not the most stringent, zoning laws in the United States. And the principle objective of the zoning law was to maintain a high quality of water in the Lake Tahoe drainage. There, zoning has been an extremely effective tool. I believe that a more comprehensive overview of sedimentation is needed. Our discussion here again has been agriculturally oriented, I think that other sources of sediment should be elucidated and examined before a law can be drawn up.

HIGHWAYS AND SEDIMENT CONTROL

Highways have probably always been recognized as potential soil erosion generators from the advent of the first muddy rutted tracks up until today's interstate highway system. For many years, society seemed concerned more with adding additional miles of roads rather than preventing soil erosion and water pollution, as a result, very little money or time was available for erosion control. During the 1960's and early 1970's people began to recognize roadside erosion as a serious threat to the environment, consequently, special regulations were implemented to initiate mandatory soil erosion control programs.

State highway departments are now required to comply with Executive Order 11507 (February 4, 1970) which pertains to the furtherence of the purpose and policy of the Federal Water Pollution Control Act.

Basically, the Order requires highway departments to do the following:

1. Limit construction operations to smaller areas (originally specified to not exceed 750,000 square feet).

2. Provide special structures such as berms, dikes, sediment basins, slope drains, etc.

3. Provide temporary erosion control on finished slopes by planting rapidly establishing vegetation or by covering slopes with suitable mulches.

4. Provide permanent vegetative cover on all disturbed sites.

Erosion control is now recognized as an integral part of modern road building techniques so we now have adequate funds to provide erosion control.

However, money alone does not substitute for years of practical experience or lack of suitable techniques. Highway construction projects present numerous unique erosion control problems because of their extensive areas and their continually changing nature.

Considering the adverse climatic conditions encountered in much of Montana, the highway department is now doing a good job of providing permanent vegetative cover on recently completed construction projects. Several of the advances in our permanent revegetation program which I attribute much of our success to are:

Dr. Bernie Jensen, Environmentalist, Department of Highways.

1. Topsoiling of all denuded construction sites with four inches of topsoil when available. This includes all interstate, primary and secondary systems along with temporary haul roads and borrow areas.

2. Close coordination with the Soil Conservation Service, Extension Service and Montana State University when developing each project's revegetation specifications.

3. Seeding a roadside as soon as possible after topsoiling is completed.

Controlling erosion during construction presents the greatest obstacles for us at this time. Some of the problems we have encountered are as follows:

1. How do we effectively stabilize a section of highway completed during the middle of a hot dry summer?

2. How can excessive erosion be halted on an area under construction during periods of high precipitation?

3. Do some large sediment basins create more adverse environmental impact than does some erosion, e.g. an area in a remote arid section of eastern Montana?

4. What storm frequency should a temporary structure be designed for, 5 years, 20 years?

5. What are effective but economical methods of temporarily preventing soil erosion in drainage ditches that will be stabilized with permanent vegetation within one year?

It is obvious that state highway departments already have stringent erosion control regulations which they are unable to completely comply with at this time. Our basic needs now are for original erosion control techniques that will allow us to meet existing regulations.

The Montana Highway Department is now in the process of trying to determine answers to some of our temporary erosion control problems along with developing new control techniques. To date we have spent thousands of dollars sponsoring revegetation research work at Montana State University. Several of the projects being conducted are:

1. Develop methods of using native sod for drainage ditch stabilization.

2. Screening studies to select rapid establishing annual and perennial grasses.

3. Determine the possibilities of irrigating roadsides to allow grass to be planted and established anytime during the summer.

4. Determine methods of establishing temporary vegetative covers followed by permanent vegetation.

The highway department is now initiating a program where several methods of temporary and permanent erosion control will be tried on each of several projects. We anticipate the foregoing type of experiments will help us develop some suitable temporary erosion control methods.

If additional state regulations are enacted in the near future, I cannot visualize them effecting our present operation to any great degree other than creating additional paper work. I cannot stress too much the point that we need new techniques to enable us to comply with existing regulations.

I am certainly in favor of effective erosion control regulations, however, I do not agree with several aspects of the proposed law.

The definition of "land-disturbing activity" recognizes only three exceptions (1) home gardens (2) individual home landscaping and (3) repairs and maintenance work. Essentially, this law dictates that I would have to file an erosion control plan to:

1. drill a well

2. plant a wind break

3. dig a fence post hole

Personally, I would consider the foregoing types of activities as very insignificant. Certainly criteria similar that for determining significant and non-significant environmental impact in the National Environmental Policy Act could be developed to weed out many insignificant activities.

I cannot believe the Soil Conservation Districts can monitor every farmer or rancher every time they clean a ditch, dig a ditch, plow a field, cultivate a field, etc.

Even without monitoring all activities as proposed, the paper work alone will keep all present soil conservation employees busy. At a time like this when taxpayers are wondering why state and federal government is growing so rapidly, I do not see how one can justify monitoring nearly every land-disturbing activity.

VIEWPOINTS FOR SEDIMENT CONTROL CONFERENCE

Since the Fish and Game Department is Montana's official recreation agency, erosion and sediment control is one of our major concerns. A Department motto, "a liveable environment for wildlife is a quality environment for man" certainly applies to conservation of soil.

Soil erosion as a geological phenomenon has been with us for centuries and will remain with us. Under natural circumstances new soil is formed by weathering processes at a rate about equal to erosion. Accelerated erosion began as soon as man developed the axe and the plow. Considerable evidence exists which indicates that the decline of numerous ancient civilizations was due in large measure to accelerated erosion and the consequent loss of their ability to produce food and fibre. Evidence also exists of primitive terraces and irrigation ditches built in an effort to conserve both soil and water. Viewing some of our watercourses in Montana today reveals we have, in the past, taken lightly the amount of soil allowed to be dumped into our waterways. Examples of sediment laden waters, primarily because of man's activities, are the Sun River near Great Falls, Clarks Fork of the Yellowstone, the Marias River, lower Spring Creek near Lewistown, and the Teton River.

Almost without exception, excessive sediment is harmful to beneficial uses of water. In the purification of domestic and industrial water supplies, the costs of clarification generally exceed all other costs. The movement of large quantities of soil from the land to the bottom of streams and lakes exacts an enormous toll in loss of land fertility, poor health of aquatic life, and reduction of recreation potential of water resources. Sediment, in the increasing amounts that are now encountered, is harmful to aquatic life and upsets the biology of surface streams. It is obvious that sediment which fills spaces under and around rocks on the stream bottom destroys the physical space necessary for bottom fauna to live. Particles of silt also adhere to the bottom fauna themselves and, in effect, suffocate the organism, particularly those more desirable fish food forms which respire by means of gills.

The effects on the fish itself vary with its stage of development. Certain adult fish can survive in a stream with high levels of sediment transport for short periods with

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Al Wipperman, Pollution Control Biologist, Fish & Game Department.

little apparent effect. Visibility is decreased, reducing the opportunity for feeding, and irritation to respiratory membranes causes a condition of stress on the fish. As the duration of sediment pollution lengthens, the fish either moves voluntarily, becomes weakened and moves involuntarily, or dies. Fish in fingerling and fry stages are more severely affected. They are weaker than adults and their food supply is more seriously affected by relatively lower levels of sediment than might be damaging to adult fish.

It is in the egg and newly hatched fry stages that the effects of sediment are most damaging. When the yolk sacs of newly hatched fry are absorbed, the fry must have a source of almost microscopic organisms as a food supply, which would be lacking in a sediment-polluted stream. During the egg and fry stages prior to emergence from the gravel, it is necessary to have water flow through the sub-strate gravel to supply oxygen and to remove metabolic waste products such as carbon dioxide from the immediate area. Both the oxygen content and velocity of flow are critical. If sediment settles over the vicinity of a redd causing the sub-strate flow to be reduced or eliminated, increased egg and fry mortalities result from lack of oxygen, waste products increase, and there is a higher incidence of pathogenic organisms.

In 1960, the Fish and Game Department initiated a sedimentation study on Bluewater Creek to determine the relationships between sedimentation in a stream and trout production and to evaluate important factors causing sedimentation and to initiate corrective steps. Results of this study support the former statements as to the effects of sediment on aquatic life. During the study, corrective action was initiated in one area to reduce the amount of sediment to Bluewater Creek. The Fish and Game Department, with assistance from the Soil Conservation Service, installed a pipeline in an eroding coulee to carry water from an artesian well, lined several hundred feet of eroding streambank with rock, and fenced about one-half mile of stream to restrict livestock. The total cost of these projects was about $19,000. These erosion abatement projects eliminated about one-half the sediment load in Bluewater Creek. Two years after the projects were installed, trout became the predominate fish. This is an example of an action program that demonstrated beneficial effects of erosion control.

At the present time, Montana has laws pertaining to sediment pollution. The 1971 Montana legislature declared sediment as a legal pollutant under the Montana Water Pollution Control Act. The Montana Open Cut or Strip Mined

Reclamation Act of 1971 also recognizes sediment as a pollutant and contains specific provisions for sediment control practices. The Federal Water Pollution Control Act states that the discharge of matter into such interstate waters or portions thereof, which reduces the quality of such waters below the water quality standards established . . . is subject to abatement in accordance with the provisions of the act. In 1935, the 74th Congress of the United States passed an act to provide for the protection of land resources against soil erosion, and established an agency known as the Soil Conservation Service to exercise the powers of the act. So we have several acts and laws pertaining to erosion and sediment control, however, several of our streams and rivers still carry heavy sediment loads, most of which man's activities are responsible. Now we are facing the possibility of a new act for soil erosion and sediment control. This may be a good act, but it will be worth little more than the paper it is printed on if funding is not properly allocated to administer the act.

While the Fish and Game Department primarily is not a land administering agency, the Department is responsible for management of wildlife and recreation areas. Erosion and sedimentation reduces the land and water's ability to produce, thereby, affecting the production of wildlife and consequently, recreation. Therefore, the Fish and Game Department encourages and supports land husbandry practices aimed at proper conservation of soil and water.

A LEGISLATOR'S VIEWPOINT

Starting out, I don't know just what attitude or what area to start on, but assuming that it would be the feeling of the legislature concerning this type of new legislation, the first question that would come to me after reading it is: Why is this legislation needed? Why I ask that question myself is this. Just as recently as 1971 we have updated and passed legislation in this area. And then other questions come up--Well are we outdated already? Were we wrong? Weren't we efficient? It brings home a lot of other questions for instance--Would it have an effect, will this new commission, this new agency--will it have any effect on our reorganization that we're trying to implement? Will it affect our department finance work? Land Management? Research? Natural resources? (and so forth). So then I reread the bill again and my conclusions--and I don't know if they are right--are as such. The first section was self-explanatory, second one was definitions, but I think the meat of the bill for me was in Section 3 and in Section 5. They posed questions to me again and some of them were answered by the first speaker this afternoon. But in order to act on legislation like this sincerely, honestly and hoping that it would do the right job, you have to have questions and you have to have answers.

Now our present law, as I see it, implements and has almost everything, that I can see, that's in this new legislation but one thing--and that was: we do now have the Districts. Is this legislation now taking the directions of the Districts--the guidelining of the Districts and placing it into a state agency? I think already, from what I've heard, I'm satisfied this is what it's going to try to do. Then the next question comes to me--If it goes that way, how will it be financed? Will we stay as we are on mil levies (I believe a mil and a half.)? If it's not, if it stays where it is, will our Districts be able to afford the additional costs that might come up out of this legislation or again will it be a new type of taxation or will it be general fund money? If it's general fund money, how much? So it comes in again--we leave that area and then we come into Section 5. Would the coal-strip mining people have to go the District and get the certification? Would they have to live under the state guidelines that are in this in addition to the mining reclamation law? Would they have to appease the District and State Commission? I think I got the answer to that fairly good.

Now to go back to the funding. Now if it becomes state funds, of course it would come to me. How could you determine if the guidelines are going to be specified by the state? I personally think I would like to know first of all what the guidelines are for this reason: it represents back here in

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Al Kosena, Montana State Representative.

Section 5 this 50-50 deal--I don't know if I got this right from the gentleman's remarks whether there was a pull-up or a matching of funds from the federal government--but it shows really for the individual rancher-farmer that if he's in compliance with the regulations of the District, he will not be deemed subject to punishment. But if he's not, or they are not, then if there is not a 50% matching, money or technical knowledge then this person, or these persons, or this activity would not again be subject to penalty. Then it would seem to me if the state is going to set up a guideline, I would have to know, as a member of the appropriations committee or a member of the legislature, how difficult those guidelines are because they could be made too stringently right away or at any time that it could be a situation where very few farmers or ranchers today would qualify. Then if you revert back to the 50-50 proposition: How much money is that going to be? It's a big figure.

Personally, as a legislator again, I know I would never vote for a fund that can't be very nearly explained. This is very vague to me. I suppose the way I'm talking would give you the opinion that I am somewhat pessimistic or that I'm an anti- or the feeling of a legislator would be anti-, this is not true. I don't mean to do that, because I'm not speaking for legislators--all of them--this is just the opinion of one legislator--myself--and these are the questions I feel I would like to have answered before I make a vote on the situation.

A COUNTY COMMISSIONER'S VIEWPOINT

Mr. Chairman, I wish there were more like you--there are very few that I know of that understand commissioners. And probably I will surprise you, Mr. Slattery, I rather doubt that the points that I choose to make will be those that you would have expected.

My remarks will be brief and two or three will be of nit-picking variety. In the first part of the act itself, rather in the first section, I suggest that whoever writes the law that will be submitted to Mr. Kosena and the rest of the legislators can include the phrase something like, "legislature finds that erosion continues to be a serious problem throughout the state" and here I would insert "unsupervised and non-accountable channel alterations". So many of our streams are not adjudicated. The ranchers, of which I have been one, run a bulldozer out in the river and take a ditch off the dam they create and it can create tremendous problems downstream. So that all of these other things that are mentioned, I think, should include "channel alterations" in the definitions. Further, throughout the proposed bill or amendment to our present bill, in Sec. 2 (d) I would insert where it refers to erosion and sediment control plan, this should be a "written" plan. In several other places I would insert "channel alterations" and the word "written" again. Over in the Section 5, Subsection D, paragraph 1 -- "deficiencies of the plan are agreed to by the plan approving authority and the person responsible for carrying out the plan", I wonder about "and the person", suppose he said "no". We're at an impass then.

We keep running into "channel alteration" and the word "written" and then, I think before the county authorities can exercise the responsibility that this amendment may designate as theirs, they will have to have strong support in the next legislature for the proposed local government legislation. As it is now, we don't have such authority. I also question whether or not any agency other than the Conservation Districts should have the authority to administer the soil district plans. It has been referred to, as some areas that are not included in the soil districts, some agency you propose should have authority but that proliferation is seldom desirable. Another small matter but a very important one in our western streams,

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Clarke Raymond, Madison County Commissioner

many of our problems are caused by trees or bushes caving off into the river, carried downstream and the roots and branches and so on are stopped and they immediately create a diversion in the normal channel. I think somebody should have the responsibility, not the authority in this case (although you must have the authority too), but somebody should be charged with the responsibility to remove such obstacles and immediately, if not sooner. I don't think this would be impossible for a county to do. If they didn't have the equipment, they could hire some to get it done. It would be hard to weigh the financial burden on the adjoining landowner because the tree may have come from 5 miles upstream or the landowner may be one of many in that area.

The responsibility should be with the Soil Conservation District. It's not a big problem, no matter who is responsible, but all of us have seen it happen and we know that if things like that were removed right away, a lot of problems downstream wouldn't occur in the first place. Another possibility for consideration by the people that are charged with writing this legislation (something I'm not going to expound on very long for two reasons--first I don't know that much about it and second it could take a long, long time) and that is the possibility of requiring that all streams or sources of water in the state be adjudicated. Without adjudication, you may know who is responsible for sediment creation, but you can't stick him with it.

A FARMER'S VIEWPOINT

I thought today I would tell you a little about my farm operation, the location, what we're doing, how we try to apply soil conservation practices in our operation. I am in the Gallatin Valley about 15 miles north of Bozeman. We're on the western slopes of the Bridger Mountains out in the Spring Hill area, if you are acquainted with that area.

Our farm is a diversified farm, primarily dry land, we raise grain, hay and cattle. I have a small hog confinement operation, and for the last few years we have used irrigation a little bit more. We used to confine irrigation to an outdoor rain dance once in a while, but unfortunately this really didn't do the job, so three years ago, I purchased a wheel-line sprinkler which has worked out real well for us. It has alleviated a lot of problems in controlling tail water. Those particular paths that I have the sprinkler on are light sandy soil, very shallow soil, and by irrigating it by flood irrigation, you turn in a big head and let it run like the dickens and it is very difficult to keep up with. Also we couldn't get the land covered. By going to the wheel-line sprinkler we have much more efficient use of the water, and we feel we are doing a much better job.

The place that I am living and farming on has been in the family for three generations. And I would hope that my boys, of which I have three, would be able to continue on the place. From this standpoint, I have a valid interest in conservation. Like I said before, I hope that my boys will be able to continue on the place--if it is all washed down the river and gone, why, the boys will have nothing to farm.

I actively started farming on the place in 1953 when I graduated from MSU. We established a conservation plan in 1962--about ten years ago--which we have been following and have made some additions to. I think that conservation planning is a good thing. I think that it is something that farmers can get ahold of and make some definite plans. They have a definite plan of action for conservation that they are working on. Now, I am sure that all farmers are conservation minded. In fact, in this day and age, if they aren't conservation minded, they aren't going to be farmers very long because there is not a margin in farming that you can afford to play around and lose some acres to erosion, lower production through erosion, things of this nature. In the Gallatin Valley, I think our Soil Conservation District is probably representative of the state. We have approximately 50% of all of the farms in the Gallatin Valley on conservation plans. This represents about 60% of the land. Now when we are talking about farms,

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Bill Wright, Farmer, Belgrade, Montana.

this is all farms that the Census Bureau defines as farms--when you get into Class 1 through 5 farms, or farms with 2500 or more income, there are about 62% of the farms with conservation plans. The Conservation District is doing quite a good job and progressing with possibly 15 or 16 new conservation plans each year in the county. New technologies are being adopted on farms all the time and as I mentioned before, we converted a flood irrigation area to sprinkler irrigation and I think that this is a type of technology that is helping to abate the sedimentation problem. Of course, stubble mulch tilling and this type of thing is becoming more prominent all the time.

I have a few questions on the model state act. I am conservative. I am a little skeptical of mandatory controls. I have a question on the timing that would be involved in this act. As I look over the act, there is one reference to a practice that conservation plans should be started within six months, and completed within one year. Now it seems to me that this would create quite a hardship on a lot of areas that have a lot of work that needs to be done. If I had to do every conservation practice that I had in mind and that I hoped to be able to do someday, within a year's time, it would be quite a hardship--even with 50% participation. I think that there needs to be more time involved. Each farm invests so much each year in capital investment, but this has to be limited due to the financial situation on the farm, so I think that this one year's time is not enough.

A CONSERVATION DISTRICT SUPERVISOR'S VIEWPOINT

I am a farmer-rancher and have been all of my life and a supervisor for about fifteen years. A number of the Chouteau County Conservation District Supervisors--incidentally the number one district in the state this year anyway--we have some pretty logical programs going on in Chouteau County Alkali and Pool District, the real serious dry wind erosion control, roadside grass seeding and many other things.

I know in the discussion here, Mr. Linford talked about Land Use Planning and I want to talk just a little bit about the District's role and what the Districts are trying to accomplish in the State of Montana in Land Use Planning and other things. I think districts can be pretty proud of what they have contributed in the field of sediment control in the past few years.

Obviously, they haven't got the job completely done. Now just to point out a few of the things that the Districts are doing. Districts own the Plant Materials Center at Bridger, Montana. Doing basic research in grass, grasses that can be used to stabilize surfaces, not only farm and ranch land but strip mining reclamation work--all of these things. Districts are almost 100% behind the new concept the Rangeland Resource Program. It is just getting off the ground, granted, but it is a real sound program that has some meat in it that can certainly help in sediment control. Districts are also 100% behind Land Use Planning House Bill 79 which was passed last time the Districts backed that legislation and I am sure there will be further amendments to this bill in the future. Districts are interested and Districts believe they can contribute something to Land Use Planning. Now in giving this presentation and looking out over the crowd, I note that there is some skepticism and rightly so. Farmers and ranchers have gone through controls in agriculture since the time when, and traditionally we like to think that we are free and can do whatever we please, but I think that if all of you will stop and consider for just a minute the day when you as farmers or ranchers, builders, fishermen or whatever you are think that you can do whatever you want to is long gone. It just ain't going to be anymore. You know that. There will be a sediment control law in the state of Montana. There must be. We have federal legislation right now that says we will have a sediment control law so we will sit down and write a sediment control law that we can work with, or someone else is going to do it for us

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Robert M. Anderson, Chouteau County District Supervisor

and we don't usually like that. We are afraid of regulation, I am and so is everyone, but I think we have to be realistic. The day of freelance agriculture is gone. We are just going to have to do a better job.

In going through the packet here I have to apologize to Slim, my mail comes by pony express, that thing was mailed a week ago and I just got it yesterday on my way over, but I did get a chance to go through part of it and in the packet this suggested guideline and standards plan for erosion and sediment control programs is an outstanding publication as far as I can see. To me the important thing in all of this is in any legislation that we pass now, let's try to do it in the framework of the government that we have today. Let's not create new agencies, more people to pay, things like this. We do have the framework to get this job done right now and we have a wealth of information that is available to you and can help a great deal.

Now on the model law I think just a brief explanation--you have to start with something when you are drafting a law and the model law to those who have worked in the legislature actually gives you a pattern. You don't have to write the law that way at all. It can be anything you want but you have to have something to start with. There are lots of things in the model law that I could quarrel with but I am not going to stand here and tear it out for that will be the legislative function. I am sure, though, that the Districts are going to make a run for the fact that we do believe that we are responsible for sediment control in our enabling legislature. Right now, we see no need to establish another authority of any kind--all we need is some more tools. One other point that I want to make here now which I think I can clear up for you, enabling legislation today as far as Districts are concerned is voluntary law. Nobody has to comply with that legislation as it is today. It is strictly voluntary. If we can get sediment control legislation, if it is control, there has to be some standards set and somebody is going to have to enforce it if we are going to have sediment control. I think you realize this, so actually all we are doing is putting teeth into the legislation that we have right now, an amendment to the law that we have right now, and I hope that we can come up with what we as supervisors, farmers and ranchers, urban people, fishermen, everybody can benefit from and live with.

OPEN DISCUSSION ON QUESTIONS

The following questions were asked and discussed:

1. Is this proposed legislation going to be publicized around the state before the legislature? I can see there is going to be a lot of questions raised under mandatory sediment control. Are you going to educate some of the people in the counties?

2. Who is going to have control over streambank erosion?

3. The Federal Water Pollution Control Act of 1972, the EPA Act of 1969 and many other acts deal with these same things. Isn't there duplication to these with this proposed sediment control legislation?

4. Shouldn't we have answers to the problems before we make the laws?

5. Isn't there criticism that some of the prohibited land use activities such as getting a permit to dig a post hole is unreasonable? How do the state and district guidelines and standards make these reasonable?

CONCENSUS AND ACTION FOR FOLLOWUP

A. G. Slattery, President of MACD announced that being the concensus seemed to be to develop legislation to comply with federal law, as a followup he appointed an ad hoc committee to work on drafting proposed legislation, to consider the proper way to introduce such legislation, and to work up an information and education program.

Mr. Slattery thanked all participants for their participation. It was very evident that each had done considerable homework and research on the subject of Sediment Control.